

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Pfleger et al. Art Unit: 2165
Serial No.: 10/802,958 Examiner: Christyann R. Pulliam
Filed: March 17, 2004 Conf. No.: 4198
Title: METHODS AND SYSTEMS FOR IMPROVING A SEARCH RANKING USING
POPULATION INFORMATION

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Commissioner for Patents
P.O. Box 1450
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BRIEF ON APPEAL

This Brief on Appeal perfects the Notice of Appeal filed herewith.

(1) Real Party in Interest

This case is assigned of record to Google Inc., who is the real party in interest.

(2) Related Appeals and Interferences

There are no known related appeals and/or interferences.

(3) Status of Claims

Claims 29-52 are pending.

Claims 29-52 are under consideration.

Claims 1-28 have been canceled.

Claims 29-52 stand rejected.

Claim 29 and 41 are in independent form.

Claims 29 and 41 are involved directly in the appeal. Claims 30-40 and 42-42 are not directly involved in the appeal but rather are involved only by virtue of their dependency from claims 29 and 41.

(4) Status of Amendments

A response pursuant to 37 C.F.R. § 1.116 was filed on September 4, 2007. This response includes amendments to the claims directly involved in the appeal. In particular, claims 29 and 41 are amended to consistently recite a “ranking,” rather than improperly switching between recitations of “ranking” and “rank.” Claim 41 is also amended to change the recitation of “operable to” to “configured to.”

These amendments were not entered for purposes of appeal as “not deemed to place the application in better form for appeal.” Nevertheless, applicant requests that appeal proceed. In particular, there is no uncertainty in scope caused by the switching between “ranking” and “rank.” Indeed, no claims stand rejected on this basis. Moreover, the rejection under 35 U.S.C. § 101 that allegedly necessitated the change from “operable to” to “configured to” is now appealed.

Accordingly, appeal can proceed notwithstanding non-entry of the amendment filed on September 4, 2007.

(5) Summary of Claimed Subject Matter

Claim 29 relates to a method that includes:

estimating a breadth of a search query (*see, e.g., specification*, page 8, line 4-6; page 9, line 15-page 10, line 17; page 12, line 21-page 14, line 2; page 14, line 5-page 15, line 12; page 16, line 3);

identifying user interaction with a first document in a result set that is responsive to the search query (*see, e.g., id.*, page 15, line 17-page 16, line 2);

changing a ranking of a popularity of the first document based at least in part on the user interaction with the first document (*see, e.g., id.*, page 8, line 21-page 9, line 8; page 15, line 10-12) and the breadth of the search query (*see, e.g., id.*, page 11, line 8-page 12, line 4; page 15, line 10-12), wherein an amount of the change in the ranking of the popularity decreases with increased breadth of the search query (*see, e.g., id.*, page 13, line 19-page 14, line 2); and making the rank¹ of the popularity of the first document available for responding to a subsequent search query (*see, e.g., id.*, page 12, line 16-17).

Claim 41 relates to an article comprising one or more machine-readable media storing instructions. The instructions are operable to cause one or more machines to perform operations. The operations include:

estimating a breadth of a search query(*see, e.g., specification*, page 8, line 4-6; page 9, line 15-page 10, line 17; page 12, line 21-page 14, line 2; page 14, line 5-page 15, line 12; page 16, line 3);

identifying user interaction with a first document in a result set that is responsive to the search query (*see, e.g., id.*, page 15, line 17-page 16, line 2);

changing a ranking of a popularity of the first document based at least in part on the user interaction with the first document (*see, e.g., id.*, page 8, line 21-page 9, line 8; page 15, line 10-12) and the breadth of the search query (*see, e.g., id.*, page 11, line 8-page 12, line 4; page 15, line 10-12), wherein an amount of the change in the ranking of the popularity decreases with increased breadth of the search query (*see, e.g., id.*, page 13, line 19-page 14, line 2); and

¹ Applicant attempted to amend this recitation of "rank" to "ranking" in the response pursuant to 37 C.F.R. § 1.116 filed on September 4, 2007.

making the rank² of the popularity of the first document available for responding to a subsequent search query (*see, e.g., id.*, page 12, line 16-17).

(6) Grounds of Rejection to be Reviewed on Appeal

As set forth in the following concise statements, the following grounds for rejection are presented for review on appeal:

Ground 1: Whether claims 41-52 are properly rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter.

Ground 2: Whether claims 41-52 are properly rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent Publication No. 2003/0135490 to Barrett et al. (hereinafter “Barrett”) and U.S. Patent No. 6,772,150 to Whitman et al. (hereinafter “Whitman”).

(7) Argument

The organization of the arguments presented hereinafter follows the organization of the ground for rejection to be reviewed on appeal set forth above. In particular, a separate boldfaced heading for each ground presented for review follows.

Ground 1: Rejections under 35 U.S.C. § 101

Claim 41 and its dependencies were rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. The rejections contend that the “machine-readable media” recited in these claims encompasses statutorily unpatentable “transmission media.”

Applicant respectfully disagrees. There are two classes of computer-readable media described in the specification. The first class of computer-readable media stores instructions that, when executed by a processor, cause the processor to perform the steps described in the

² Applicant attempted to amend this recitation of “rank” to “ranking” in the response pursuant to 37 C.F.R. § 1.116 filed on September 4, 2007.

specification. *See, e.g., specification*, page 4, line 20-22. The second class of computer-readable media may transmit or carry instructions to a computer. *See, e.g., id.*, page 5, line 7-9. *See also id.*, page 4, line 22 - page 5, line 2 (describing that embodiments of computer-readable media include storage or transmission devices).

Claim 41 and its dependencies deal exclusively with the first class of computer-readable media. In particular, claim 41 recites “one or more machine-readable media storing instructions.” Media that store instructions are clearly useful, concrete and tangible physical articles, objects, and/or manufactures-- and hence statutory. Moreover, there is no reason to believe that those of ordinary skill would not be able to distinguish between media that store instructions and media that transmit/carry instructions, especially when armed with the specification.

Since the computer-readable media that store instructions exclude the allegedly unpatentable transmission media, the recited machine-readable media are statutory. Accordingly, applicant requests that the rejections of claim 41 and its dependencies be withdrawn.

Claim 41 was also rejected under 35 U.S.C. § 101 based on an alternative basis, namely, the recitation of an article that includes instructions “operable to” cause one or more machines to perform operations. In particular, the rejection contends that the use of the term “operable to” renders the recited operations optional and claim 41 unstatutory. The rejection also maintains that this alleged deficiency can be remedied by amending claim 41 to recite that the instructions are “configured to” cause one or more machines to perform the recited operations.

Applicant respectfully disagrees. To begin with, applicant is at a loss to understand the alleged distinction between “operable to” and “configured to” with regard to optional operations. In particular, neither phrase requires that the operations actually be performed.

Moreover, to the best of applicant’s understanding, there is no requirement under 35 U.S.C. § 101 that an article actually perform operations. For example, a hammer that is operable to drive a nail is clearly statutory whether or not the hammer is actually required to drive the nail.

Accordingly, the phrase “operable to” does not render claim 41 non-statutory and applicant requests that the rejection be withdrawn.

Ground 2: Rejections under 35 U.S.C. § 103(a) as obvious over Barrett and Whitman.

The rejections of claims 29 and 41 contend that it would have been obvious for one of ordinary skill to have combined Barrett and Whitman and arrive at the recited subject matter.

Applicant respectfully disagrees. For example, even if Barrett and Whitman were combined (which applicant does not concede), one of ordinary skill would not change a ranking of a popularity of a document such that the amount of the change in the ranking decreases with increased breadth of a search query having a responsive result set that includes the document, as recited in claims 29 and 41.

In this regard, Barrett describes a system in which user interaction with a search result set is collected and used to generate “enhanced popularity rankings.” *See, e.g., Barrett, para. [0009].* According to Barrett, the following types of user interaction information can be collected:

“what information was selected, what was it ranked when it was selected, what is the historical use rate of the information selected, what summary of the selected information was shown to the user, was there a pre-defined

expectation of use for the information, time of day and date of selection and personalized data about the user (what zip code are they in, do they have preferences, are they male/female, are they in a particular profession, and historical data about their previous selections).” *See, e.g., id., para. [0011].*

Please note that Barrett does not change his “enhanced popularity rankings” based the breadth of the search query *per se*. Indeed, the rejection admits as much. *See Office action mailed July 3, 2007, page 3, section 6.*

Instead, Barrett presents two different approaches for generating his “enhanced popularity rankings.” The first is the adaptive inflation approach, where:

$$\text{Enhanced Popularity Score} = \sum h_1 * \frac{\sum_{\text{pop}} h_B}{\sum_{\text{pop}} h_i}$$

See, e.g., id., paras. [0017]-[0032]. The second is the blended inflation approach, in which a site is tracked as both a highly trafficked site and sparsely visited site with two different decay rates. *See, e.g., id., para. [0034].* In the adaptive inflation approach, the rank adjusted score (h_B) is the product of a hit or click ($h=1$) and the rank of a site(i.e., $f(\text{rank})$) in a set of search results. *See, e.g., id., paras. [0018]-[0020].* The distribution for $f(\text{rank})$ is equal to one when the rank of the site is one and *increases* for lower ranked results. *Id.*

Barrett’s adaptive inflation approach would thus appear to lead one of ordinary skill away from the claimed decrease in the amount of the change in ranking with increased search query breadth. In this regard, consider a hit or click on a document in two different circumstances, namely, 1) when the document is ranked in the middle of a result set having ten documents, and 2) when the document is ranked in the middle of a result set having 1000 documents. Since the

distribution for Barrett's $f(\text{rank})$ increases for lower ranked results, Barrett would weigh a hit or click in the second circumstance more heavily, resulting in an incrementally larger increase in the popularity score.

This incrementally larger increase in score after a hit or click on a lower ranked site appears to be similar to the approach described in U.S. Patent Publication No. 2002/0049752 to Bowman et al. (hereinafter "Bowman"), which was cited in the Office action mailed January 18, 2007. In particular, Bowman's rating scores for selected items are incremented by a larger amount when a selected item is further from the beginning of a query result.

To the extent that the larger number of results returned by a broader search query inherently allows for the selection of lower ranked results, both Barrett and Bowman describe that a hit in a larger result set returned by a broader search query is to be weighted by an incrementally larger factor than a hit in a smaller result set returned by a smaller search query. Admittedly, the breadth of the search query is not an essential component of Barrett's and Bowman's calculations, since both Barrett and Bowman are believed to weigh the selection of the eighth ranked document in a result set having ten documents above the selection of the first ranked document in a result set having 1000 documents. Nevertheless, both Barrett and Bowman describe that incremental changes in popularity increase with the selection of lower ranked results in broader search queries. This at least suggests the opposite of the decreased amount of change in the ranking with increased search query breadth recited in claims 29 and 41.

Against this backdrop, the rejection contends that it would be obvious for one of ordinary skill to turn to Whitman and change a ranking of a popularity of a document such that the amount of the change in the ranking decreases with increased breadth of a search query having a responsive result set that includes the document, as recited in claims 29 and 41.

Applicant respectfully disagrees. To begin with, Whitman does not rank the popularity of documents at all. Rather, Whitman describes a search refinement system that uses a history of search queries to generate *related search phrases*. *See, e.g., Whitman*, col. 3, line 39-42. In particular, Whitman's system uses the frequency with which specific phrases containing key terms have been submitted to the search engine in combination with the query term(s) entered by a user to recommend related search phrases. *See, e.g., id.*, col. 3, line 42-48. By incorporating such historical query information, Whitman's system produces related search phrases that are frequently used by other users increases the likelihood that these related search phrases will be helpful to refine the search of a present user. *See, e.g., id.*, col. 3, line 48-52.

To begin with, a “related search phrase” is not a document in a result set that is responsive to a search query. Instead, a related search phrase is simply another search phrase. Whitman thus does not rank the popularity of documents but rather provides a set of related search phrases.

Moreover, even if one were to consider a related search phrase to be a document in a result set that is responsive to a search query, one of ordinary skill would still not arrive at the subject matter recited in claims 29 and 41. In this regard, Whitman describes that the related search phrases can be selected for presentation to a user based on the number of matches that were found using the related search phrases. *See, e.g., id.*, col. 2, line 28-35. *See also id.*, col. 3,

line 52-57 (describing that historical query submissions that produce a NULL query result are ignored); col. 5, line 52-57 (describing that the search phrases can be scored based on the number of hits produced, with search phrases that produced relatively small numbers of hits (but more than zero) being scored more highly). Thus, the related search phrases are scored based on *their own breadth*—rather than the breadth of search query used to find the related search phrases.

When these deficiencies were pointed out in the response filed September 4, 2007, the Advisory Action mailed September 12, 2007 simply contended that “Whitman explains how query breadth can be used to assist in that area [of improving search results.]” While Whitman does mention that breadth is a factor to be considered in the generation of related search phrases, Applicant maintains that Whitman does not lead those of ordinary skill to change a ranking of a popularity of a document such that the amount of the change in the ranking decreases with increased breadth of a search query having a responsive result set that includes the document, as recited in claims 29 and 41. As discussed above, related search phrases are not documents. Moreover, Whitman ranks the related search phrases based on their own breadth—not based on the breadth of a search query having a responsive result set that includes the related search phrases. Whitman thus does not involve changing the ranking of a popularity of a document based on the breadth of a search query having a responsive result set that includes the document at all.

Thus, even if Barrett and Whitman were combined, one of ordinary skill would still not change a ranking of a popularity of a document such that the amount of the change in the ranking decreases with increased breadth of a search query having a responsive result set that includes the document, as recited in claims 29 and 41.

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Since one of ordinary skill would not arrive at the recited subject matter even if Barrett and Whitman were combined, claims 29 and 41 are not obvious over Barrett and Whitman. Applicant respectfully requests that the rejections of claims 29, 41, and the claims dependent therefrom be withdrawn.

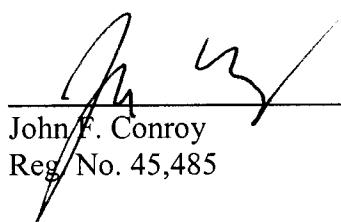
CONCLUSION

The absence of a reply to a specific rejection, issue, or comment does not signify agreement with or concession of that rejection, issue, or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper.

This Appeal Brief is filed with a Notice of Appeal. Please apply the Appeal Brief fee and Notice of Appeal fee and any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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Appendix of Claims

29. A method comprising:

estimating a breadth of a search query;

identifying user interaction with a first document in a result set that is responsive to the search query;

changing a ranking of a popularity of the first document based at least in part on the user interaction with the first document and the breadth of the search query, wherein an amount of the change in the ranking of the popularity decreases with increased breadth of the search query; and

making the ranking of the popularity of the first document available for responding to a subsequent search query.

30. The method of claim 29, wherein estimating the breadth of the search query comprises estimating the breadth based on a total number of documents in a result set that is responsive to the search query.

31. The method of claim 29, wherein estimating the breadth of the search query comprises estimating the breadth of the search query based on differences in relevances of documents in the result set.

32. The method of claim 29, wherein estimating the breadth of the search query comprises comparing rates at which the documents in the result set are retrieved.

33. The method of claim 29, wherein changing the ranking of the popularity of the first document comprises weighting the user interaction with the first document based on the breadth of the search query.

34. The method of claim 33, wherein changing the ranking of the popularity of the first document further comprises adding the weighted user interaction to a popularity database configured to store measures of a popularity of documents.

35. The method of claim 29, wherein identifying user interaction with the first document comprises determining a click count for the first document.

36. The method of claim 29, wherein identifying user interaction with the first document comprises determining a click-through ratio for the first document.

37. The method of claim 29, wherein identifying the user interaction with the first document comprises identifying the user interaction independent of a search query.

38. The method of claim 29, further comprising responding to a subsequent search query based at least in part on the ranking of the popularity of the first document.

39. The method of claim 38, wherein responding to the subsequent search query comprises adjusting a ranking of documents in the response to the subsequent search query based at least in part on the ranking of the popularity of the first document.

40. The method of claim 29, wherein changing the ranking of the popularity of the first document comprising increasing the ranking of the popularity of the first document.

41. An article comprising one or more machine-readable media storing instructions configured to cause one or more machines to perform operations comprising:
estimating a breadth of a search query;
identifying user interaction with a first document in a result set that is responsive to the search query;
changing a ranking of a popularity of the first document based at least in part on the user interaction with the first document and the breadth of the search query, wherein an amount of the change in the ranking of the popularity decreases with increased breadth of the search query; and
making the ranking of the popularity of the first document available for responding to a subsequent search query.

42. The article of claim 0, wherein estimating the breadth of the search query comprises estimating the breadth based on a total number of documents in a result set that is responsive to the search query.

43. The article of claim 0, wherein estimating the breadth of the search query comprises estimating the breadth of the search query based on differences in relevances of documents in the result set.

44. The article of claim 0, wherein estimating the breadth of the search query comprises comparing rates at which the documents in the result set are retrieved.

45. The article of claim 0, wherein changing the ranking of the popularity of the first document comprises weighting the user interaction with the first document based on the breadth of the search query.

46. The article of claim 45, wherein changing the ranking of the popularity of the first document further comprises adding the weighted user interaction to a popularity database configured to store measures of a popularity of documents.

47. The article of claim 0, wherein identifying user interaction with the first document comprises determining a click count for the first document.

48. The article of claim 0, wherein identifying user interaction with the first document comprises determining a click-through ratio for the first document.

49. The article of claim 0, wherein identifying the user interaction with the first document comprises identifying the user interaction independent of a search query.

50. The article of claim 0, further comprising responding to a subsequent search query based at least in part on the ranking of the popularity of the first document.

51. The article of claim 50, wherein responding to the subsequent search query comprises adjusting a ranking of documents in the response to the subsequent search query based at least in part on the ranking of the popularity of the first document.

52. The article of claim 50, wherein changing the ranking of the popularity of the first document comprising increasing the ranking of the popularity of the first document.

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Evidence Appendix

None.

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Related Proceedings Appendix

None.